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Pocillopora inflata, A New Species of Scleractinian Coral (Cnidaria: Anthozoa) from the Tropical Eastern Pacific[1]

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ABSTRACT: *Pocillopora inflata*, n. sp., a relatively rare zooxanthellate scleractinian coral, is described from live colonies collected in the Galápagos Islands (Ecuador) and from three additional localities in the tropical, far-eastern Pacific region. Distinguishing features are (1) swollen terminal or subterminal branches, (2) verrucae acute and few in number or absent, and (3) columellae prominent in calices at mid to lower branch levels. The swollen branches and acute verrucae serve to separate *Pocillopora inflata* from two morphologically similar species: *Pocillopora diomedeae* Vaughan from Easter Island and *Pocillopora informis* Dana from Hawai'i. Comparisons of the type colony with paratypes from the Galápagos Islands and elsewhere in the eastern Pacific revealed notable intraspecific variability in peripheral branch thickness and verrucae number and length. This new species is found at shallow depths (2–10 m), often intermixed with other species of *Pocillopora*. Where present at five survey sites in the Galápagos Islands, it made up from 2 to 17% of all species of pocilloporids combined, with population densities ranging from 0.2 to 2.5 colonies per hectare.

THE ZOOXANTHELLATE SCLERACTINIAN coral genus *Pocillopora* (Family Pocilloporidae) is an abundant and widespread taxon throughout the tropical Indo-Pacific region. More than 50 named species have been described (Wells 1983), and currently about 10 extant species are recognized (Veron 1995). Although today restricted to the Indo-Pacific region, *Pocillopora* is known from the Eocene of the Caribbean and was present there as recently as 110,000 yr ago (Geister 1977). Much of the taxonomic confusion in this genus is due to its highly variable morphology, greatly influenced by environmental conditions (e.g., degree of exposure to turbulence, depth, and corallivore activity) and the relatively few morphometric characters available for delimiting species' boundaries.

The curious pocilloporid species described in this paper was first recognized in surveys of coral recovery in the Galápagos Islands, following the 1982–1983 El Niño disturbance (Robinson 1985, Glynn 1990). Although this species is rare to uncommon, its gross morphology allows relatively easy recognition in the field. It has now been observed at several sites within the Galápagos Islands, in Panamá, Costa Rica, and México. One dead colony was found on an uplifted shelf at Urvina Bay, indicating its presence in the Galápagos Islands since at least 1954 (Colgan 1990).

Discounting this new species, at least seven species of *Pocillopora* have been recognized in the far-eastern Pacific. Even though the eastern Pacific is depauperate in reef-building scleractinian corals, the number of *Pocillopora* species at any given locality is high. For example, 25% (3 of 12 species [Reyes Bonilla 1992]) of the reef-building scleractinian fauna of the Gulf of California

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belongs to the genus *Pocillopora.* Similar comparisons for the Revillagigedo Islands reveal 35% (7 of 20 species [Ketchum and Reyes Bonilla 1997]); for Panamá, 26% (5 of 19 species [Holst and Guzmán 1993]); and for the Galápagos Islands, 30% (6 of 20 species [unpubl. data]).

In this paper I describe *Pocillopora inflata,* n. sp. from material collected from the Galápagos Islands, Panamá, Costa Rica, and México; offer survey data on the abundance of the new species at several sites in the Galápagos Islands; and present a key for identification of far-eastern Pacific species of *Pocillopora.*

MATERIALS AND METHODS

Seventeen colonies of *Pocillopora inflata* formed the basis of this study: three whole colonies and clusters of branches from six colonies collected in the Galápagos Islands, one small colony collected in Costa Rica, one whole colony and branches collected from two colonies in México, and branches from four colonies collected in Panamá (Figures 1, 2). All material was hand-collected alive except for one dead colony from Urvina Bay, Galápagos, which was found on a shelf elevated above sea level. Other species of *Pocillopora* examined in this study were borrowed from the collections of the National Museum of Natural History, Smithsonian Institution (USNM); the Natural History Museum, London (NHM); the Peabody Museum of Natural History, Yale University (YPM); the Museum of Zoology, University of Costa Rica (UCR); the Smithsonian Tropical Research Institute, Panamá (STRI); and the Marine Invertebrate Museum, Rosenstiel School of Marine and Atmospheric Science, University of Miami (UMML).

All material was examined with a binocular dissecting microscope under 6× to 50× magnification. At least 20 measurements were made with a calibrated ocular micrometer or calipers and rule of microskeletal structures sampled randomly at all levels of branch or colony surfaces. Verrucae abundance (density) was measured with a square centimeter grid placed randomly on colonies from the summits of branches to their bases. A scanning electron microscope (ISI-DS 130) was used to reveal the fine structure of corallites and extra calicular structures. The swollen branches of three colonies were sawed open to search for gall-crab (hapalocarcinid) chambers.

To quantify the abundance of *Pocillopora inflata* and other species of *Pocillopora* in the Galápagos Islands, all colonies were counted by divers (free diving to 5-m depth and scuba diving deeper to about 12 m) swimming parallel to the shoreline in five study transects of known area off four islands. The maximum diameter and height, and condition of every coral were noted. These plots were surveyed approximately yearly to assess coral recovery after the 1982–1983 El Niño disturbance.

Statistical comparisons of morphometric measurements of colonies were conducted using parametric or nonparametric tests, depending upon the nature of the data in specific cases.

Genus *Pocillopora* Lamarck, 1816

Pocillopora inflata Glynn, n. sp.
Figures 3–5

DESCRIPTION: Colony heavy with thick, compact branches that are oval to circular in cross section (Figure 3*A*). Some branches have undergone partial to complete fusion, maximum colony diameter 25 cm, minimum diameter 17 cm, maximum height 15 cm. Mean maximum distal branch width 23.3 mm (SD = 11.15, range = 10.3–61.6, $n = 26$ branches measured; this sample represents measurements of all of the larger distal colony branches). The larger branch widths or thicknesses are a result of branch fusion. About one-fourth of the lower unattached colony base is dead, covered with crustose coralline algae, bryozoans, polychaetous worm tubes, and bivalves. The colony surface that was attached to the side of a large basalt block contains several embedded horse hoof limpets (*Hipponix grayanus* Menke, 1853). Most of the upper colony branches that were alive when collected appear swollen, and the larger branches are relatively

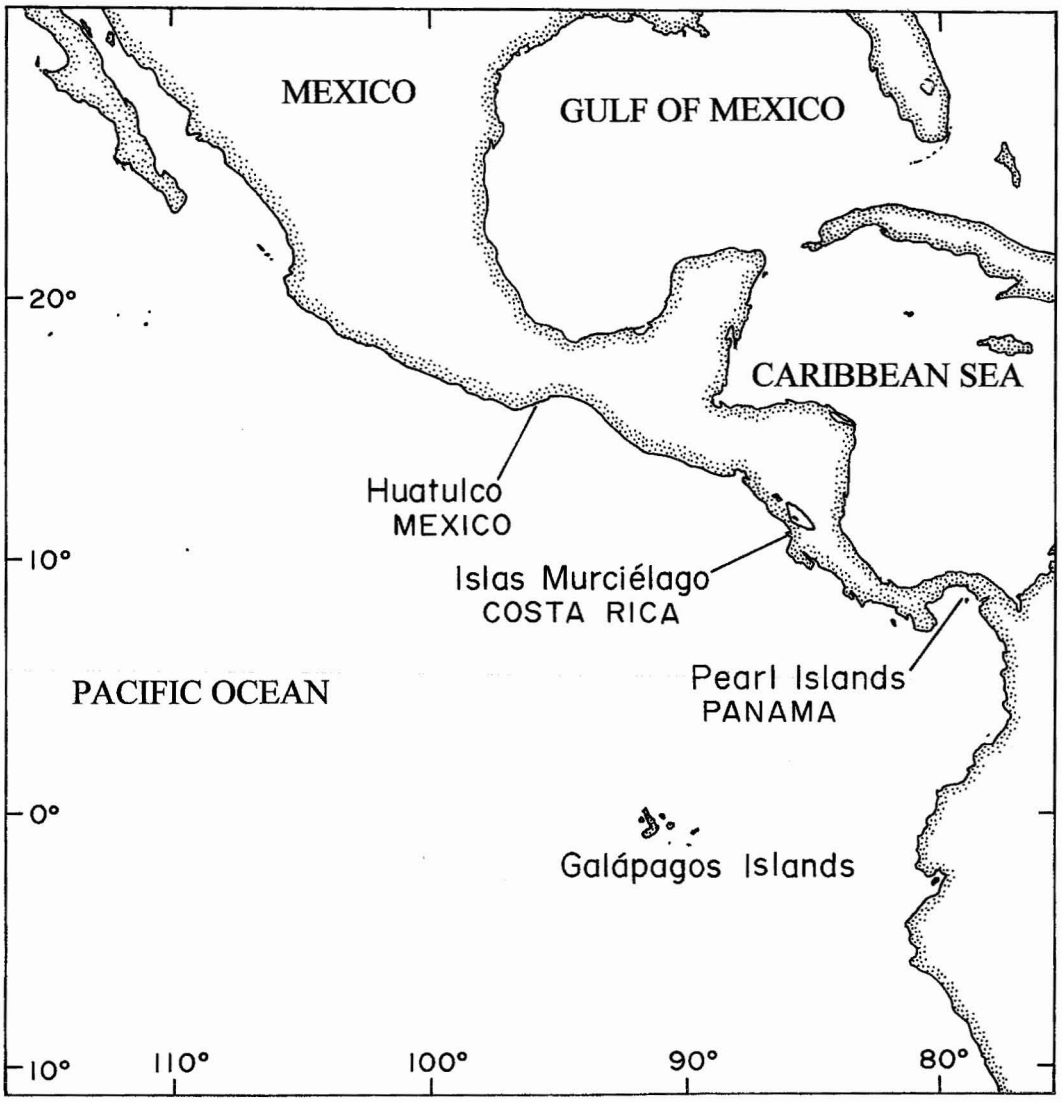

FIGURE 1. Tropical eastern Pacific localities where *Pocillopora inflata* has been collected.

smooth with few acute verrucae concentrated on their sides. Smaller branches are less swollen, with acute verrucae on sides and also on branch tips. Several hapalocarcinid galls are scattered over the colony surface. Verrucae density: mean = 1.55 cm^{-2} (SD = 2.36, range = 0–9, $n = 40$ verrucae measured); verrucae are typically more abundant near the branch tips than lower on the branches, mean = 2.80 cm^{-2} (SD = 2.68) at upper 4-cm level compared with 0.30 cm^{-2} (SD = 0.90) below 4 cm. Verrucae length: mean = 2.17 mm (SD = 0.44, range = 1.4–3.1 mm, $n = 40$). Corallite diameters: mean = 1.36 mm (SD = 0.27, range = 0.9–2.0 mm, $n = 20$). Distal corallites often cellular with thin walls whose free edges are sometimes smooth, but more often armed with spinules. Patches of cellular corallites also occur on some mid to lower branches. Corallite walls

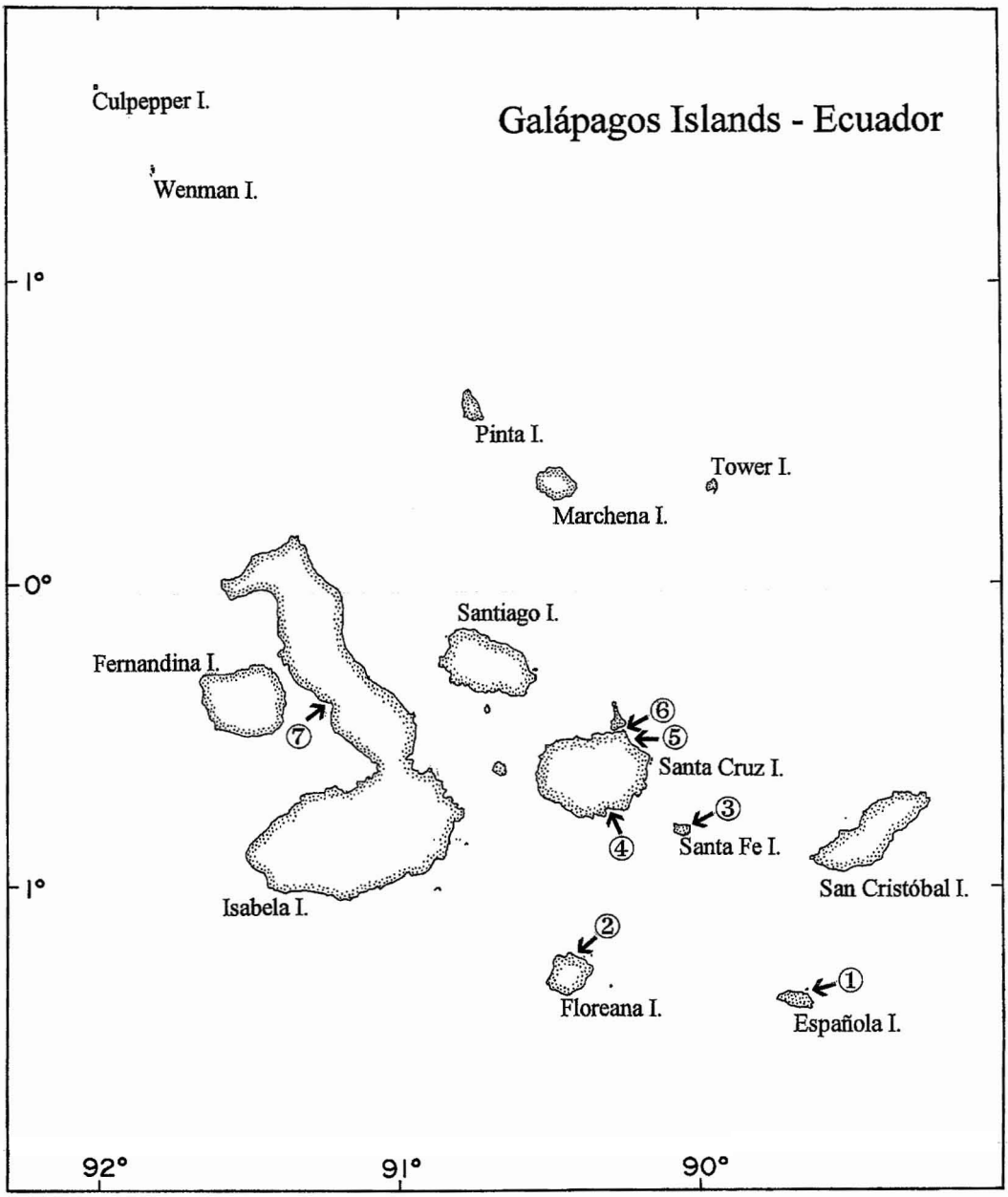

FIGURE 2. Collection sites of *Pocillopora inflata* within the Galápagos Islands: 1, type locality: Gardner Bay, Española Island; 2, Cormorant Bay, Floreana Island; 3, NE anchorage, Santa Fe Island; 4, Academy Bay, Santa Cruz Island; 5, Caleta Robinson, Santa Cruz Island; 6, Punta Carrión, Santa Cruz Island; 7, Urvina Bay shelf uplift, Isabela Island.

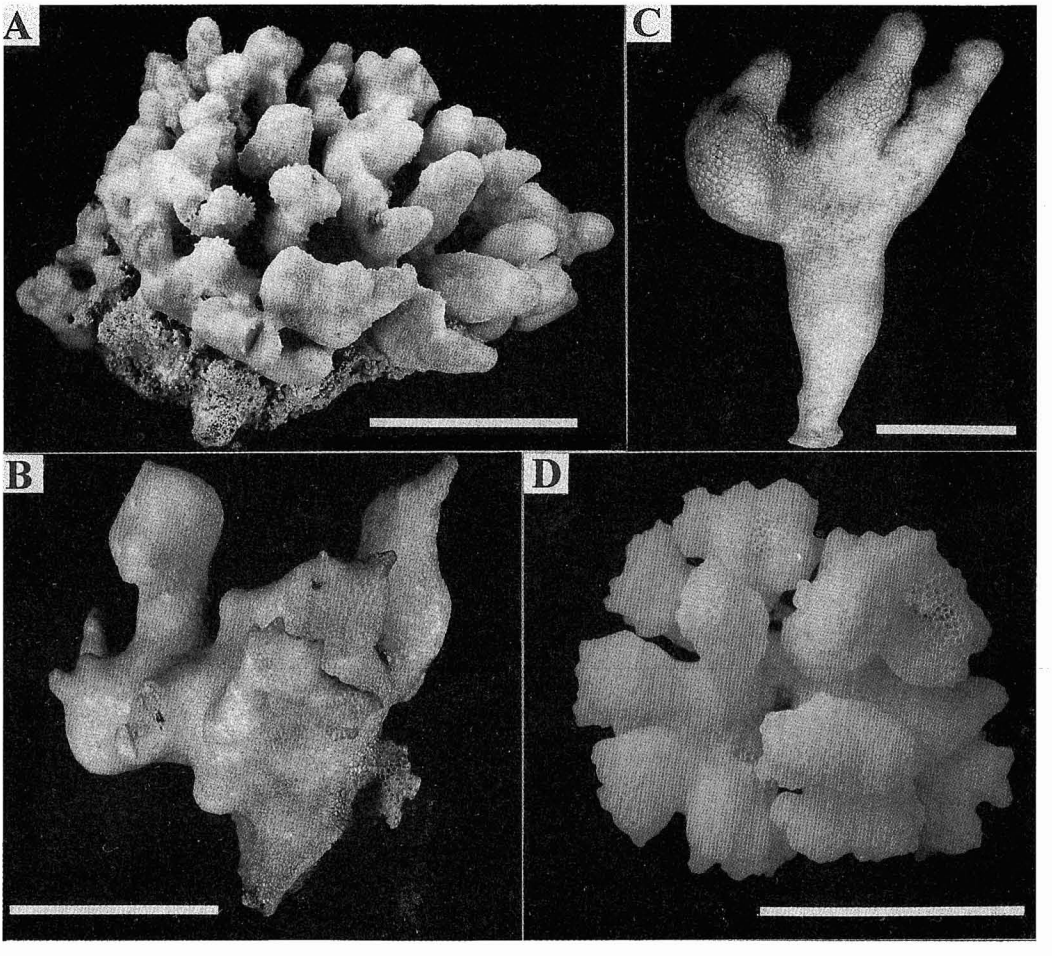

FIGURE 3. *Pocillopora inflata*. *A*, Holotype, USNM 99393, whole skeleton, 8-m depth, Gardner Bay, Española Island, Galápagos Islands. *B*, Paratype, ECCD-I-2196, a branch from a colony 24 cm maximum diameter, 9 cm high, Gardner Bay, Española Island, Galápagos Islands. *C*, Paratype, UMML 8.1454, a colony branch, 2-m depth, Academy Bay, Santa Cruz Island, Galápagos Islands. *D*, Paratype, YPM 23741, whole skeleton, 9-m depth, Punta Carrión, Santa Cruz Island, Galápagos Islands. Scale bars: *A*, 10 cm; *B*, 4 cm; *C, D*, 3 cm.

often thicker lower on branches and with free edges armed with spinules. Distal cellular corallites usually have larger diameters than proximal thick-walled corallites. Coenosteum also better developed at lower branch levels and have numerous denticles. Septa usually absent, but occasionally present as 6 to 12 faint traces. Columella usually present in noncellular corallites, ranging from boses and keels to prominent fascicles.

SUPPLEMENTARY DESCRIPTIVE NOTES: Fusion of branches also occurs in paratype colonies from the Galápagos Islands (Urvina Bay uplift and Punta Carrión) and in two colonies from Panamá (Saboga Island, Pearl Islands). Because most collections involved only the removal of a few of the peripheral branches from colonies often exceeding 25 cm in diameter, it is likely that branch fusion is more prevalent than indicated by the material at hand. Large colonies from the Galápagos Islands (Punta Carrión, Academy Bay, and Urvina uplift), Huatulco (México), and Saboga Island (Panamá) often possess both swollen branches and relatively thin,

tapering branches approximately one-half to one-third the diameter of the largest branches (Figure 3*B,C*). Multiple or tiered branch swellings are present in the Urvina colony. Peripheral branch widths demonstrate highly significant differences both among locations and between colonies: Galápagos, mean = 22.69 mm, $n = 5$ colonies; Panamá, mean = 14.08 mm, $n = 4$; México, mean = 23.37 mm, $n = 3$ (two-way analysis of variance [ANOVA], $F = 23.58, \mathrm{df} = 2, P < 0.0001$). Mean branch widths of colonies were compared using the Bonferroni multiple comparison test in which "experimentwise" error rate was held at the $P < 0.1$ level. This a posteriori testing indicates that all mean values are different at $P < 0.033$ ($n = 173$ measurements). In some colonies, branches taper notably below peripheral swellings and are easily broken at their narrowest points (Figure 3*C*). Verrucae densities are low in all paratypes, ranging from relatively high means of 1.30 (Costa Rica) and 1.75 (Huatulco) verrucae per square centimeter to low means of 0.20 (Urvina uplift) and 0.25 (Española Island) per square centimeter in the Galápagos Islands. The mean values are significantly different ($P < 0.001$, Kruskal-Wallis one-way analysis of variance on ranks), with the Huatulco colony showing a higher density of verrucae than Galápagos colonies from Española or Urvina ($P < 0.05$, Dunn's pairwise multiple comparison procedure). Mean verrucae length in Galápagos paratypes ranges from 1.63 (SD = 0.40) to 2.68 (SD = 0.74) in colonies from Academy Bay and Punta Carrión, respectively. Mean verrucae lengths in colonies from other localities are 2.40 (SD = 0.63), Panamá; 3.11 (SD = 0.88), Costa Rica; 2.12 (SD = 0.33), México. Mean verrucae lengths among colonies demonstrate a significant difference ($P < 0.001$, Kruskal-Wallis ANOVA). All pairwise comparisons ($P < 0.05$, Dunn's method) indicate that verrucae are significantly longer in the colony from Costa Rica than in that from Santa Fe (Galápagos); and that verrucae are longer in colonies from Punta Carrión, Urvina, and Panamá than in colonies occurring off the Charles Darwin Research Station, Academy Bay, Santa Cruz Island (Figure 2, site 4).

TYPE MATERIAL: Holotype: USNM 99393, Gardner Bay, Española Island, Galápagos Islands, 01° 21′ 32″ S, 89° 38′ 35″ W (Figure 2, locality 1), colony maximum × minimum diameters 27 cm × 18 cm, 15 cm high, depth 8 m, coll. P. W. Glynn, 1 March 1994. Paratypes: ECCD-I-2196 (Charles Darwin Research Station), Gardner Bay, Española Island, Galápagos Islands, 01° 21′ 32″ S, 89° 38′ 35″ W, single branch from colony 24 cm diameter, 9 cm high (Figure 5*C*), depth 5 m, coll. P. W. Glynn, 21 May 1995; UMML8.1453, Punta Carrión, Santa Cruz Island, Galápagos Islands, 00° 28′ 07″ S, 90° 15′ 15″ W (Figure 2, locality 6; Figure 5*A* and *B*), two branches from colony 20 cm diameter, 15 cm high, depth 4 m, coll. P. W. Glynn, 28 May 1995; YPM 23741, Punta Carrión, collecting information as in previous sample except that an entire colony was collected, 12 cm diameter, 7 cm high, depth 9 m; UMML8.1454, Academy Bay, Santa Cruz Island, Galápagos Islands, 00° 44′ 25″ S, 90° 18′ 23″ W (Figure 2, locality 4), single branch from colony transplanted from Caleta Robinson, Santa Cruz Island, Galápagos Islands (Figure 2, locality 5), depth 1 m, coll. P. W. Glynn, 31 May 1995; UCR-902, Isla San Pedrito, Islas Murciélago, Gulf of Papagallo, Guanacaste, Costa Rica, 10° 51′ 15″ N, 85° 56′ 58″ W (Figures 1, 5D), an 8-cm-diameter colony (recruit), depth 6–7 m, coll. C. Jiménez, 12 October 1995; UMML8.1455, Galápagos Islands, two branches from 15-cm-diameter colony, collecting information as in UMML8.1454 (above); UMML8.1456, Gardner Bay, Española Island, Galápagos Islands, 01° 21′ 32″ S, 89° 38′ 35″ W (Figure 2, locality 1), single branch from colony 23 cm diameter, 17 cm high, depth 7 m, coll. J. S. Feingold, 2 June 1996; UMML8.1457, Urvina Bay, Isabela Island, Galápagos Islands, 00° 23′ 14″ S, 91° 13′ 47″ W (Figure 2, locality 7), whole colony, maximum diameter 21 cm, minimum diameter 15 cm, 19 cm high, from an uplifted shelf a few meters above sea level, coll. P. W. Glynn, 9 June 1997; UMML8.1458, NE anchorage, Santa Fe Island, Galápagos Islands, 00° 48′ 02″ S, 90° 02′ 18″ W (Figure 2, locality 3), three branches from a colony 20 cm diameter, 19 cm high, depth 5 m, coll. P. W. Glynn, 23 May 1995.

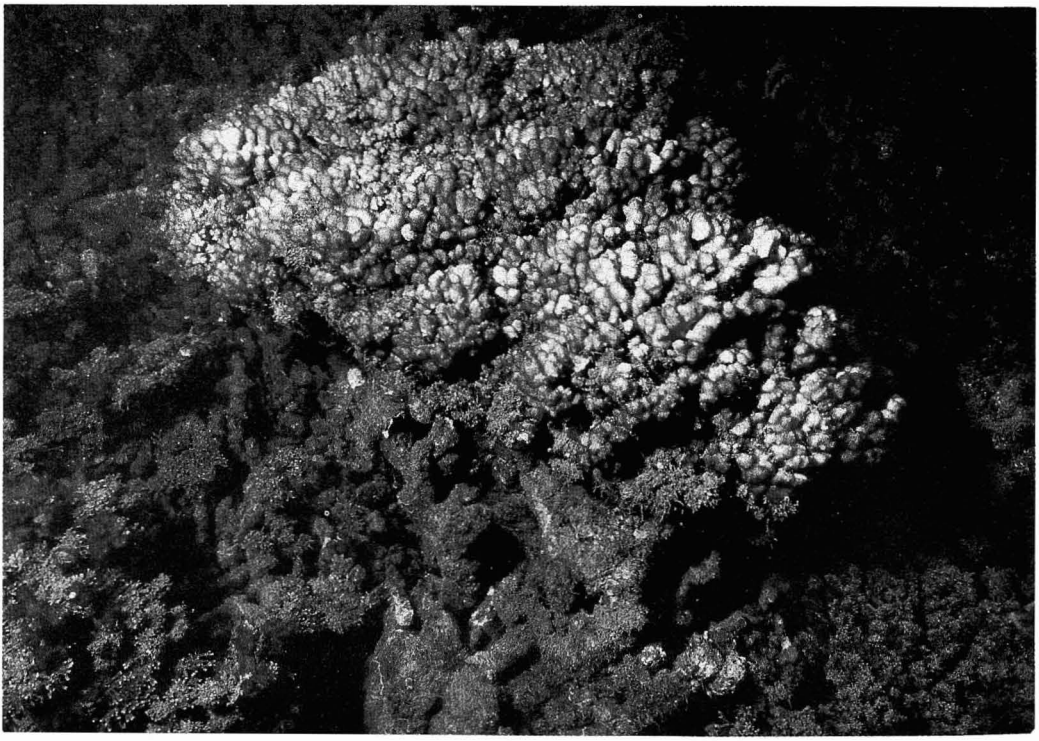

FIGURE 4. *Pocillopora inflata:* a live 80-cm-diameter colony at La Entrega reef, Huatulco, México (7-m depth, 7 December 1997).

OTHER MATERIAL EXAMINED (in author's personal collection): La Entrega reef, Huatulco, Oaxaca, México, 15° 44′ 34″ N, 96° 07′ 35″ W (Figure 1), two branches each from two colonies 80 cm diameter, depth 8 m, coll. P. W. Glynn, 7 December 1997 (Figure 4); La Entrega reef, collecting information same as above except that whole colony measured 14 cm in diameter, 22 cm high, depth 6 m. Saboga Island reef, Pearl Islands, Gulf of Panamá, Panamá, 8° 37′ 37″ N, 79° 03′ 19″ W (Figure 1), four branches each from four colonies 25–30 cm diameter, depth 5 m, coll. P. W. Glynn, 22 March 1998.

ETYMOLOGY: The species name is from the Latin adjective *inflatus* (swollen, puffed up), referring to the swollen or inflated appearance of the colony branch tips.

FIELD OBSERVATIONS: *Pocillopora inflata* is easily recognized in the field by its peripheral swollen branches. Its overall tissue coloration also often differs from that of other pocilloporid species. In the Galápagos Islands and Costa Rica, live colonies were often turquoise green compared with brown to golden brown colonies of *Pocillopora damicornis* (Linnaeus) and *Pocillopora elegans* Dana. In Huatulco (México), large colonies were mustard yellow in contrast to various shades of brown of other *Pocillopora* spp. nearby.

The largest known population of *Pocillopora inflata* occurs at the Saboga Island (Pearl Islands) coral reef (see Fig. 2 in Glynn and Stewart 1973), where at least 100 colonies are intermixed with *Pocillopora damicornis* at about 5-m depth. A single colony of *P. inflata* also was collected at 5-m depth at Contadora Island, about 1 km east of Saboga Island, Panamá, by J. L. Maté on 20 March 1995. Six colonies collected from the Saboga population and held in buckets overnight

TABLE 1

RELATIVE ABUNDANCES AND POPULATION DENSITIES OF *Pocillopora inflata* AND *Pocillopora* SPP. AT SIX SURVEY SITES IN THE GALÁPAGOS ISLANDS WHERE THE NEW SPECIES HAS BEEN FOUND

SURVEY SITE[a]	AREA (ha)	DATE	*Pocillopora inflata* NO.	%	NO. HA^{-1}	*Pocillopora* SPP.[b] NO.	%	NO. HA^{-1}
Gardner Bay	3.0	1 March 1994	6	5.3	2.0	107	94.7	35.7
Española I.		21 May 1995	5	7.7	1.7	60	92.3	20.0
1° 21′ 32″ S		3 June 1996	1	1.9	0.3	53	98.1	17.7
89° 38′ 35″ W		24 May 1997	6[c]	10.5	2.0	51	89.5	17.0
Cormorant Bay	4.0	27 February 1994	1	5.9	0.2	16	94.1	4.0
Floreana I.		23 May 1997	0	0	0	4	100.0	1.0
1° 13′ 30″ S								
90° 25′ 19″ W								
NE anchorage	2.5	4 March 1994	0	0	0	6	100.0	2.4
Santa Fe I.		23 May 1995	2	6.4	0.8	29	93.6	11.6
0° 48′ 02″ S		26 May 1997	0	0	0	5	100.0	2.0
90° 02′ 18″ W								
Academy Bay	0.02	8 May 1993	4	9.3	200.0	39	90.7	1,950.0
Santa Cruz I.		17 May 1995	8	7.0	400.0	106	93.0	5,300.0
0° 44′ 25″ S								
90° 18′ 23″ W								
Caleta Robinson	1.1	7 March 1994	0	0	0	33	100.0	30.0
Santa Cruz I.		28 May 1995	0	0	0	28	100.0	25.4
0° 29′ 48″ S		6 June 1996	1[c]	3.8	0.9	25	96.2	22.7
90° 14′ 47″ W		28 May 1997	0	0	0	11	100.0	10.0
Punta Carrión	0.8	28 May 1995	2	16.7	2.5	10	83.3	12.5
Santa Cruz I.								
0° 28′ 07″ S								
90° 15′ 15″ W								

[a] Geographic coordinates are from hydrographic charts (1 : 15,000 to 1 : 60,000) and denote the centers of the survey areas.
[b] *Pocillopora elegans* and *P. damicornis* were the most abundant species, but *P. eydouxi, P. capitata*, and *P. meandrina* were also observed.
[c] Two colonies observed at Gardner Bay and the one colony observed at Caleta Robinson were tentatively identified as *P. inflata* although the development of verrucae tended toward that characteristic of *P. elegans*.

spawned eggs (one colony) and sperm (five colonies) intermittently between 0730 and 1030 hours on 22 March 1998, lunar day 24. Copious amounts of spawn and mucus lifted from the colony surfaces, forming buoyant strings. Eggs were visible in the spawn issuing from one colony, and microscopic examination of formalin-preserved samples revealed numerous spermatozoa with flagella.

Twelve colonies of *P. inflata*, six large (ca. 25 cm diameter) and six small (ca. 8 cm diameter), were observed between 6 and 7 m depth at San Pedrito Island, Islas Murciélago, Costa Rica, by C. Jiménez. These colonies were intermixed with about 1000 to 3000 colonies of other species of *Pocillopora.* Only five colonies of *P. inflata* have been observed at Huatulco, México, during surveys of several pocilloporid reefs.

Quantitative surveys of all species of *Pocillopora* in the Galápagos Islands also have revealed relatively low abundances of *Pocillopora inflata.* When present, *P. inflata* ranged from 1.9 to 16.7% of all pocilloporid species sampled at six sites (Table 1). The population densities of *P. inflata* were also low, ranging from a few colonies per hectare at most sites to 200–400 colonies per hectare in Academy Bay. These latter densities are unnaturally inflated because pocilloporid corals were transplanted to the Academy Bay site, which is only 200 m^2. At three sites (Cormorant Bay, NE anchorage, and Caleta Robinson), *P. inflata* was present during

some surveys, but absent after 1 to 3 yr in subsequent surveys. In fact, the abundances of all pocilloporid species showed marked interannual fluctuations. Some of the dead colonies of *P. inflata* were still intact and attached to the substrate, but completely covered by crustose coralline algae and filamentous algae. The cause of death is unknown.

COMPARISONS: Among co-occurring eastern Pacific species of *Pocillopora*, *Pocillopora inflata* shares several characters with *Pocillopora eydouxi* Milne-Edwards & Haime, including large colony size, stout branches, verrucae, and a well-developed columella. However, colony branching in *P. inflata* occurs more frequently than in *P. eydouxi*, resulting in shorter, compact branches that are often fused. Although the peripheral branches of *P. eydouxi* are often flabellate, they are more uniform in thickness and never swollen as in *P. inflata.* Highest mean verrucae densities in *P. inflata* are 1.55 cm^{-2} (holotype) and 1.75 cm^{-2} (paratype), compared with mean = 5.70 (SD = 1.52, range = 3–9, $n = 20$) in a colony of *P. eydouxi* from Iguana Island, Panamá (GPI 16, from personal collection of J. Maté). In addition, verrucae in *P. eydouxi* are more uniform in size (both length and width), more evenly distributed over the colony surface, and with blunt tips in contrast with *P. inflata.* Finally, although both species possess well-formed columellae, those in *P. eydouxi* are pinnaclelike (Figs. 84 and 85 in Veron and Pichon 1976) and simple, whereas those in *P. inflata* are often fascicular (Figure 5). Cantera et al. (1989), on the basis of a phenetic analysis, demonstrated a close, but distinct, relationship between *P. eydouxi* and *Pocillopora elegans.* Still, *P. elegans* and *P. inflata* are easily separated by colony morphology and several differences in such skeletal structures as verrucae and columellae.

Two species of *Pocillopora* found outside the eastern Pacific, with some characters resembling *P. inflata*, now require examination. One syntype each of *Pocillopora diomedeae* Vaughan from Easter Island (USNM 68277) and *Pocillopora informis* Dana from the Hawaiian Islands (USNM 441) were compared with *P. inflata.* [It should be noted that Maragos (1977) did not recognize the validity of *Pocillopora informis*, but suggested that it was a wave-stressed form of *Pocillopora meandrina* Dana or *Pocillopora ligulata* Dana.]

Like *P. inflata, P. diomedeae* possesses few, poorly developed verrucae (Vaughan 1906). Verrucae density, mean = 1.43 cm^{-2} (SD = 1.15, range = 0–4, $n = 35$), and length, mean = 1.74 mm (SD = 0.60, range = 0.8–3.2 mm, $n = 22$), overlap comparable measurements in *P. inflata.* The columella in *P. diomedeae* is prominent, but it terminates in one to several ascending spines and is not fascicular as it often is in *P. inflata.* In addition, *P. diomedeae* has two and occasionally three well-developed septal cycles, whereas only one to two faint cycles are present in *P. inflata.* Both mean verrucae density, mean = 2.12 cm^{-2} (SD = 1.79, range 0–5, $n = 40$), and length, mean = 3.56 (SD = 0.63, range 2.8–4.8, $n = 20$), were greater in *P. informis* than in *P. inflata.* Moreover, the verrucae in *P. informis* are stout and blunt compared with thin and acute verrucae in *P. inflata.* As in *P. inflata*, the septa in *P. informis* are obsolescent (Vaughan 1907). The columellae are well developed in *P. informis*, styliform and nearly always attached to an elongated septum, a condition never observed in *P. inflata.* Finally, the most obvious difference separating the three species is the swollen peripheral branches in *P. inflata*, which are absent from *P. diomedeae, P. informis*, and all of the other species of *Pocillopora* examined in this study.

KEY TO THE FAR-EASTERN PACIFIC SPECIES OF *Pocillopora*

[with the exception of *Pocillopora verrucosa* (Ellis & Solander), which may be synonymous with *Pocillopora elegans*, and possibly an undescribed species from México]

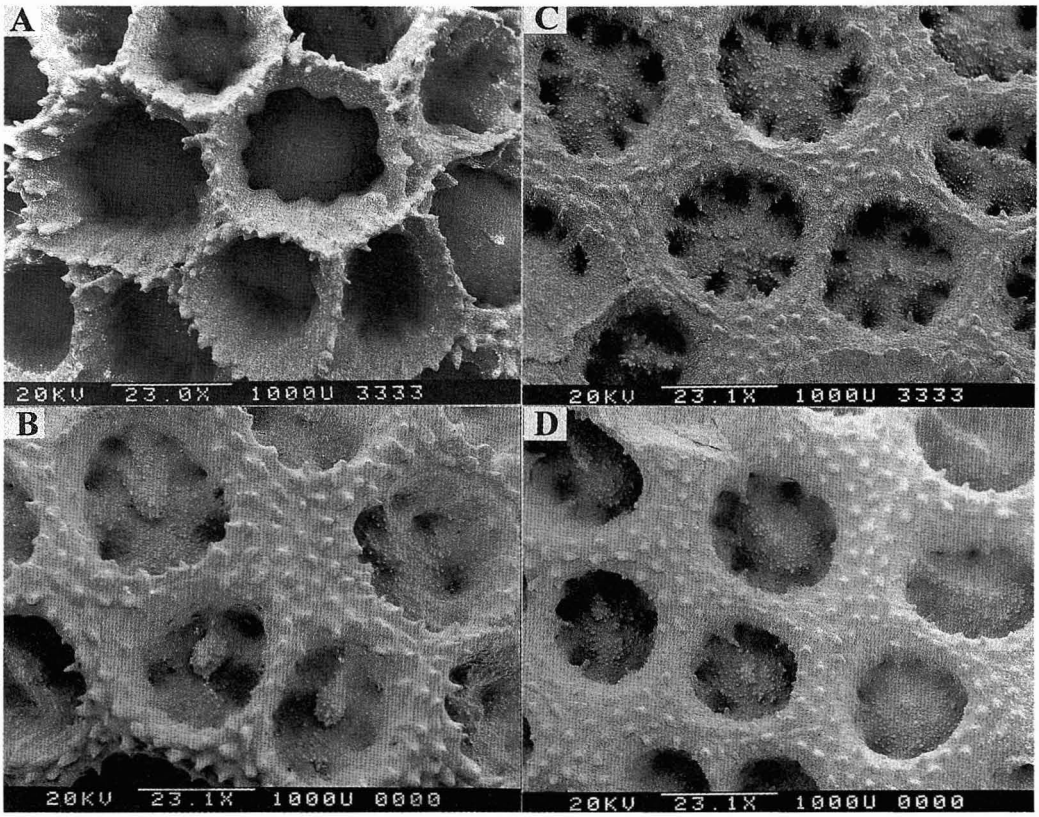

FIGURE 5. *Pocillopora inflata:* SEM photographs of calices. *A*, Upper 1-cm level of branch tip, from colony 20 cm diameter, 15 cm high (UMML8.1453), Punta Carrión, Santa Cruz Island, Galápagos Islands, 28 May 1995. *B*, From 4- to 5-cm level below branch tip, same colony as *A*. *C*, From 4- to 5-cm level below branch tip, from colony 24 cm diameter, 9 cm high (ECCD-I-2196), Gardner Bay, Española Island, Galápagos Islands, 21 May 1995. *D*, From 4- to 5-cm level below branch tip (UCR 902), Islas Murciélago, Guanacaste, Costa Rica, 12 October 1995.

1. With verrucae; colony branches thick, stout 2
1. Without verrucae, colony branches relatively thin, 1–1.5 cm or less in diameter..... ..... *Pocillopora damicornis* (L.)

2(1). Columella well developed, styliform or fascicular..... 3
2. Columella low, weakly developed or absent..... 4

3(2). Colony branches elongate, upright, often laterally flattened distally and with numerous blunt verrucae ..... *Pocilopora eydouxi* Milne-Edwards & Haime
3. Colony branches swollen, with few, short, acute verrucae .... *Pocillopora inflata*, n. sp.

4(2). Branches infrequently divided; branches laterally flattened and with broad, meandering summits ..... *Pocillopora meandrina* Dana
4. Branches frequently divided; branches oval to round in cross section 5

5(4). Clavate terminal branches without verrucae; verrucae on sides of branches acute, thornlike ..... *Pocillopora capitata* Verrill
5. Terminal branches rounded or pointed; verrucae nipple-shaped..... ..... *Pocillopora elegans* Dana

DISCUSSION

With the description of *Pocillopora inflata*, the already high contribution of this genus to the diversity of eastern Pacific coral faunas is further increased. *Pocillopora* spp. make up 24% of the zooxanthellate scleractinian fauna of Costa Rica (5 of 21 species [Cortés and Guzmán 1998]), 32% of both the Galápagos (5 of 19 species [unpubl. data]) and Panamanian (6 of 22 species [unpubl. data]) faunas, and 58% of the Huatulco (México) fauna (7 of 12 species [Glynn and Leyte Morales 1997]). The two pocilloporid species added to the Galápagos fauna since Wells' (1983) study are *Pocillopora meandrina* and *Pocillopora eydouxi.* Two of the eight *Pocillopora* species at Huatulco may represent additional undescribed species.

Pocillopora inflata is widely distributed in the Galápagos Islands, found at seven sites on five islands. However, it has a low relative abundance, ranging from only 1.9 to 16.7% of all *Pocillopora* species sampled. Its population density also is very low, ranging from 0.2 to 2.5 colonies ha^{-1}. Because overall coral mortality was about 97% in the Galápagos during the 1982–1983 El Niño–Southern Oscillation (ENSO) event (Glynn 1990), current low abundances probably reflect this severe disturbance. Recovery since 1983 has been negligible to slow (Glynn 1994). All live colonies have probably recruited since 1983. A large dead colony of *P. inflata* was found on the Urvina Bay uplift, which was elevated suddenly during a volcanic eruption in 1954 (Colgan 1990), so this species has been present in the Galápagos Islands for more than four decades. Thus, *P. inflata* is not a recent ENSO-associated immigrant, as has been hypothesized for some Indo-West Pacific mollusk (Finet 1991, Kay 1991), echinoid (Lessios et al. 1996), and fish (Grove 1989) species occurrences in the eastern Pacific. *Pocillopora inflata* may have evolved within the eastern Pacific, dispersing widely over much of the region.

The 100+ colonies of *P. inflata* at Saboga Island, Panamá, is the largest known population of this species. It has been seen in Panamá only in the northern Pearl Islands. Considering the few colonies observed in Costa Rica and México, *P. inflata*, like *P. meandrina* and *P. eydouxi*, can be regarded as an uncommon to rarely collected species.

The spawning of Saboga Island *P. inflata* is the first observation of any species of *Pocillopora* actually spawning in the eastern Pacific. Because histological studies of *P. damicornis* and *P. elegans* suggested that spawning in the Gulf of Panamá usually occurs near full and new moon and during the nonupwelling warm season (Glynn et al. 1991), the large volumes of spawn released near the third quarter lunar phase and during the upwelling season were unexpected. However, this spawning event did occur in March 1998, during the 1997–1998 ENSO when Gulf of Panamá sea surface temperatures (SSTs) were unusually high. Climatological March SSTs in the Gulf of Panamá are 24.5°C (Podestá and Glynn 1997); the mean March SST in 1998 was 27.7°C, 3.2°C above the norm (unpubl. data, Naos Island, courtesy of the Smithsonian Tropical Research Institute).

All known populations of *Pocillopora inflata* occur in upwelling environments. It has not yet been found at localities with more stable sea temperature regimes, notably coastal Ecuador, Colombia, Gulf of Chiriquí (Panamá), SE Costa Rica, Revillagigedo Islands, and Clipperton Atoll. Whether this is indicative of specific ecological requirements related to upwelling conditions remains to be determined.

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